The vital link between early MEP design and decarbonisation

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Agenda

- Landscape
- Future Homes
- Non-domestic
- Energy challenges
- Fabric
- What about new technology
- Why do you need MEP consultant

Landscape

A changing landscape for energy compliance- in new build world, will this filter into the existing stock

Building Regulations
15th June 2022

Future Homes Standard Consultation
Spring 2023

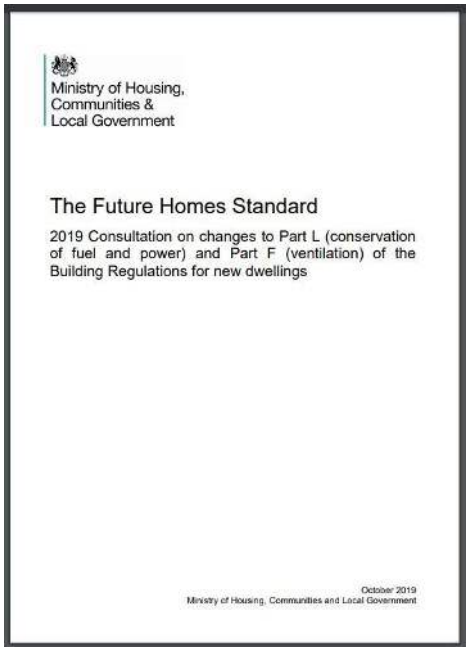
Future Homes Standard published
Autumn 2025

FHS comes into effect
2026

Will this be pushed back?

Net Zero by 2050?

Updates to Part F
Updates to Part L to SAP10 methodology
New Part O
New Part S


Ministry of Housing, Communities & Local Government

The Future Homes Standard

2019 Consultation on changes to Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for new dwellings

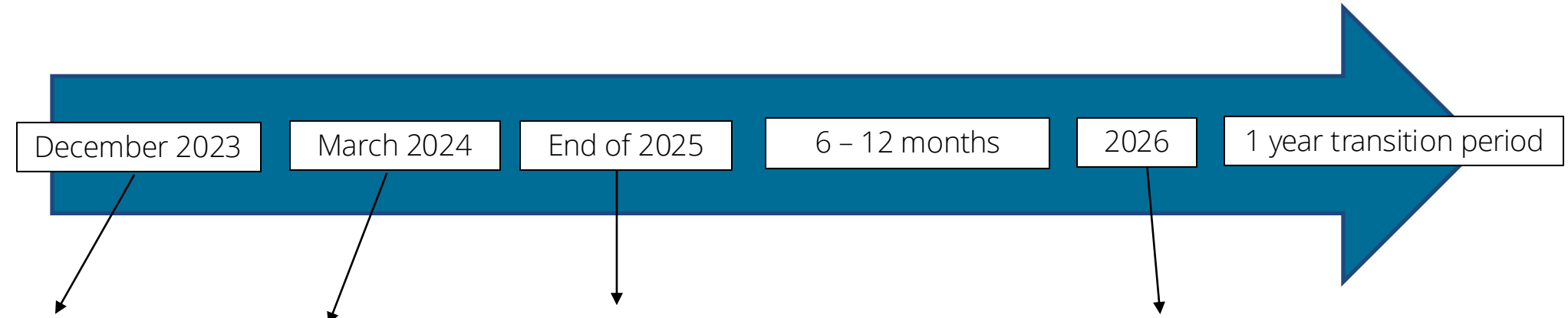
October 2019
Ministry of Housing, Communities and Local Government

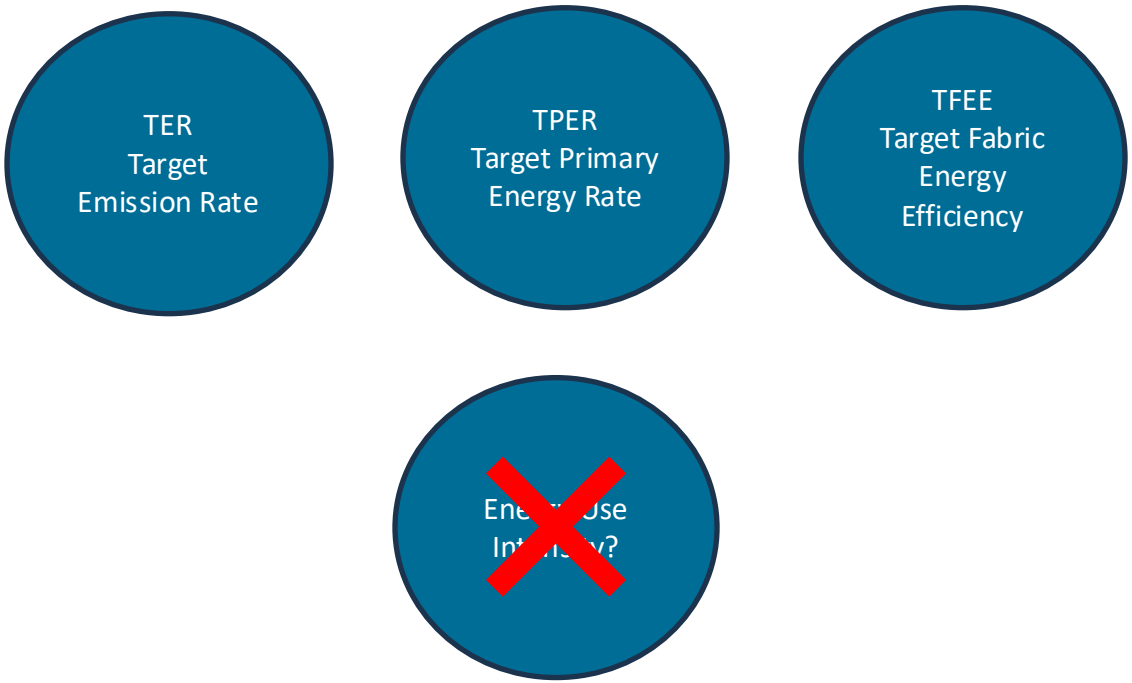
SAP11 to be released

Legal agreement to achieve

Future Homes standard

Future Homes and Buildings Standard





New definition of 'commencement'
- foundations/lowest floor

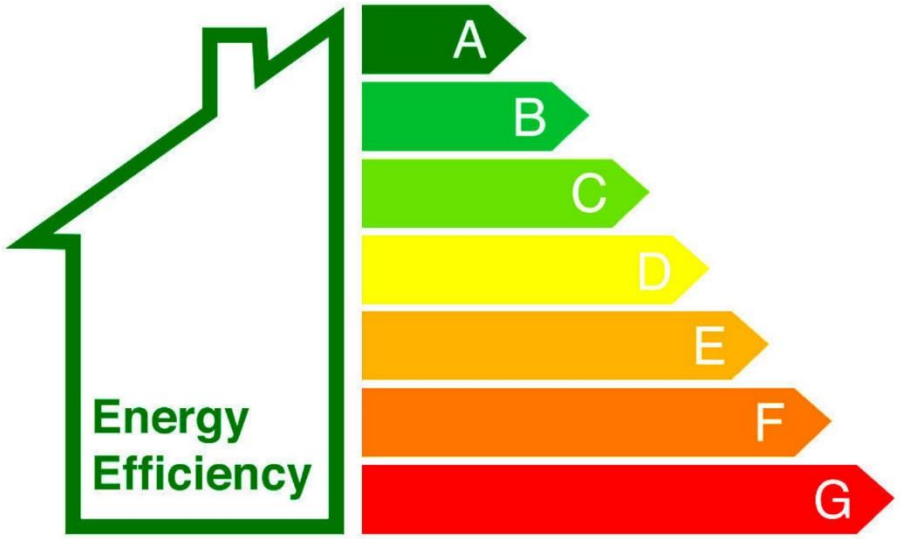
Apply to individual buildings as in 2021

Sunsetting of 2013 and 2010

Future Homes and Buildings Standards applies to new buildings, regardless of whether the site has benefited from previous transitional arrangements.

EPCs

Should be used as a tool for Net Zero Carbon ready buildings

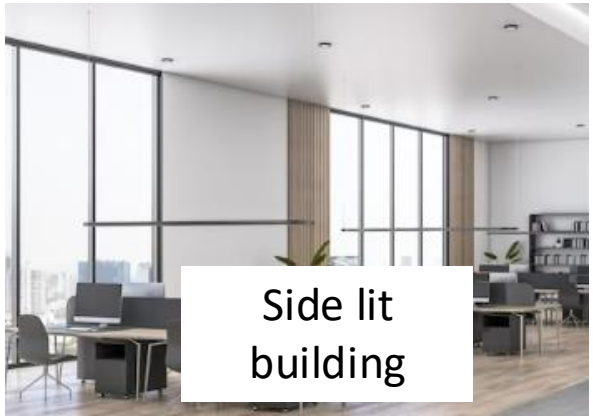


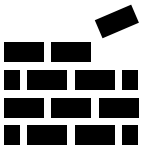
32% of buyers interviewed by Mortgage Advice Bureau would consider higher rated EPCs for their next property

- Based on an energy cost metric NOT energy efficiency or carbon metric
- Starting to notice a push to desire for EPC B ratings linked with Green Mortgage Rates
- Rentals now required to be E rated as are offices… They are hinting this might go to C.
- Consumers interested in low running costs
- EPC reform bill transitions to HEM in second half of 2026, will this include non-domestic

Non Domestic

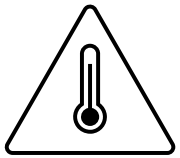
Performance requirements for non-domestic buildings





2021 fabric standards
PLUS enhanced air tightness

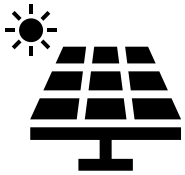
2021 fabric standards



Radiant electric heating

ASHP
Or 4th gen heat network

Enhanced lighting efficacy (105lm/cW)
Enhanced heat recovery efficiency



75%

40%

40%

20%

Minimum efficiencies for services

COP 3.5

COP 2.5

105lm/cW

CIBSE CP1

Include within fixed services

Real world performance

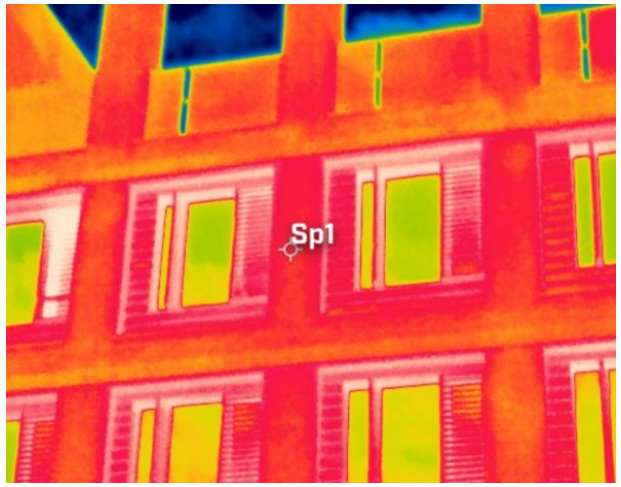
Expected performance

Measured performance

Poor build quality

Higher bills

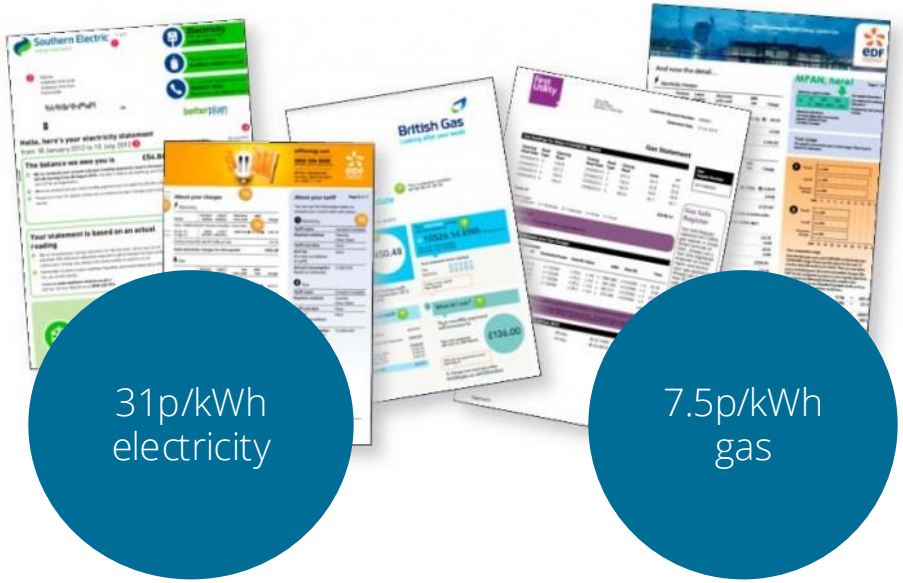
- Voluntary post occupancy performance testing
- Use of Smart Meter Enabled Thermal Efficiency Rating (SMETER)
- Future Homes Standard ‘brand’
- Increased commissioning requirements



Energy challenges with decarbonisation

Are heat pumps the solution?

Cost to run



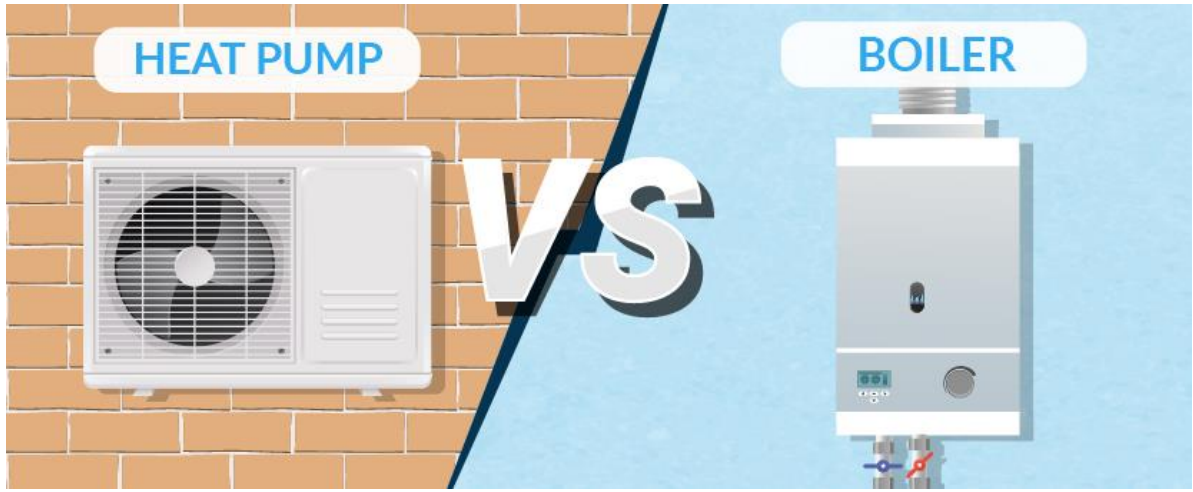
31p/kWh electricity

7.5p/kWh gas

- Average Seasonal efficiency of heat pump is COP 2.3
- Cost per kWh is 4 x more for electricity

43% increase in bill to run heat pump

Issues with air sources heat pumps

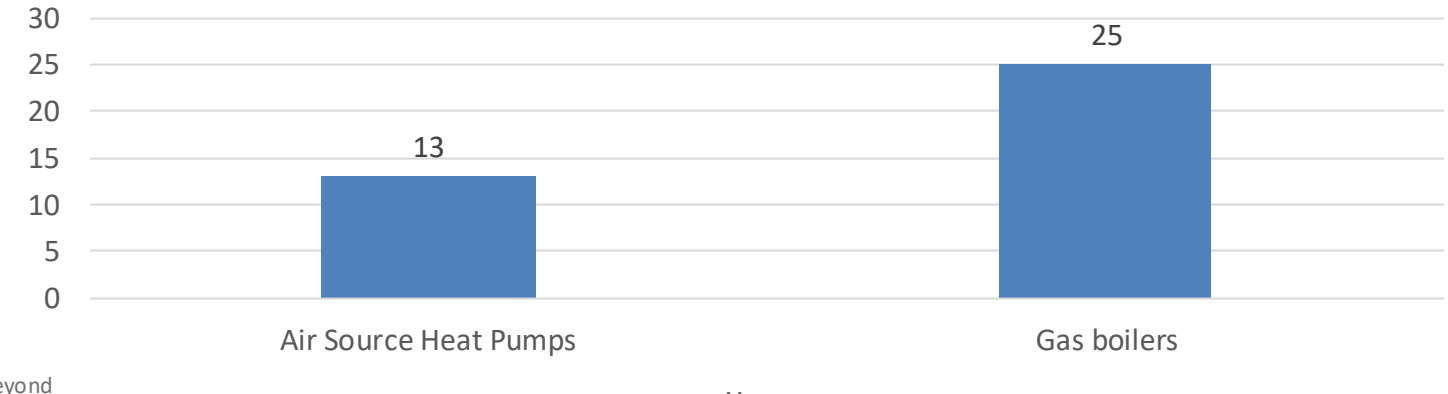


Cost to install

£6000

£1000

Life expectancy



Acoustic constraints

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).

b. 55dB L_{AFmax}, more than 10 times a night (between 11pm and 7am).

Enhanced air flows for traditional housing

20l/s to 50l/s per room In-line extract fans

Boosted MVHR

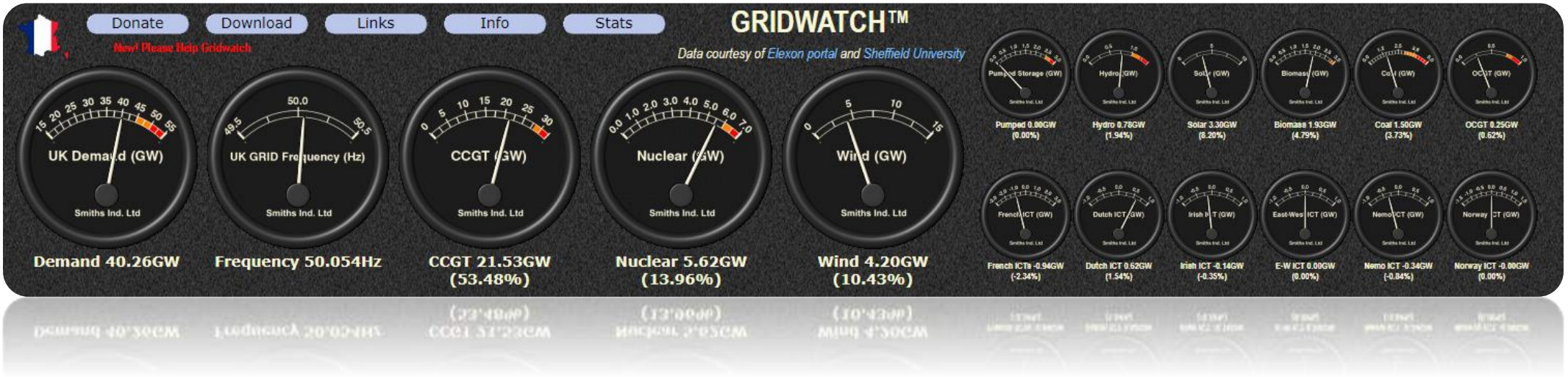
Heat pump hot water cylinder

MVHR with tempered air

Heat pump/full cooling

Energy prices and electricity generation

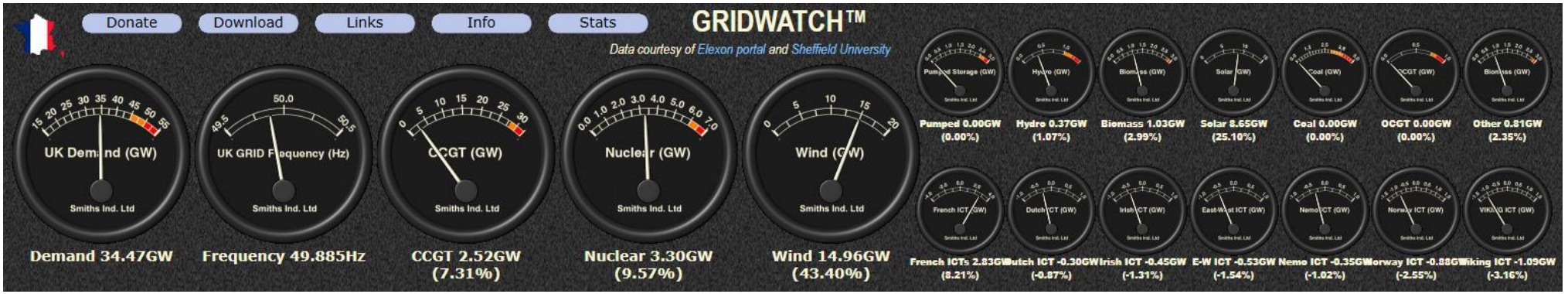
Winter generation mix



- 53% of peak power is coming from combined cycle gas turbines
- High electricity prices have been driven by this
- Contribution from wind power and renewable sources is increasing, but this is not happening fast enough

Energy prices and electricity generation

Summer generation mix



- 43% of peak power coming from wind!
- 25% from the sun!

The power conundrum with going green

Max UK installed capacity 42GW

- Had to import power from Europe twice last Winter

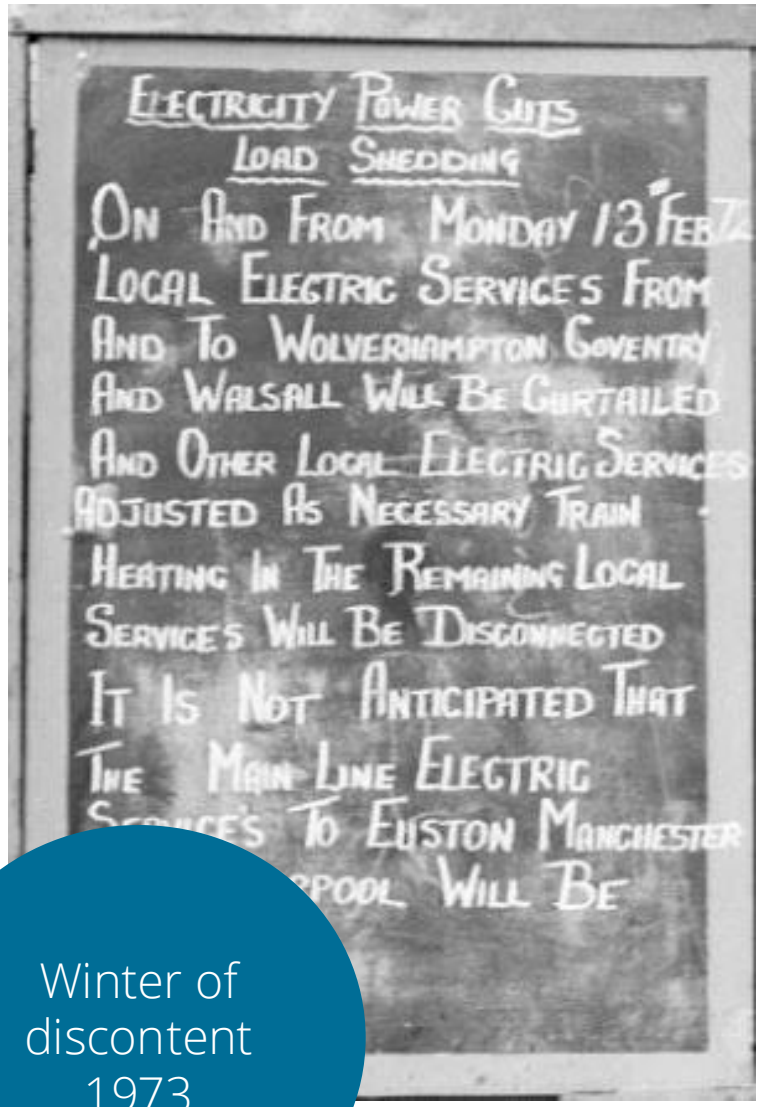
- Standard home with gas boiler
- 1kW average per year of electricity

- Standard home with ASHP + EV charging
- 1kW average per year of electricity

PLUS 5kW for the heat pump
PLUS 7kW for the EV charging

- TOTAL 12kW
- And that's per home at 230,000 new homes per year that's an additional 1.4GW

The power conundrum with going green



Winter of discontent 1973

- Our office in South Africa is used to the term ‘load shedding’
- The UK could be potentially be out of power at peak times

Winter 2028?

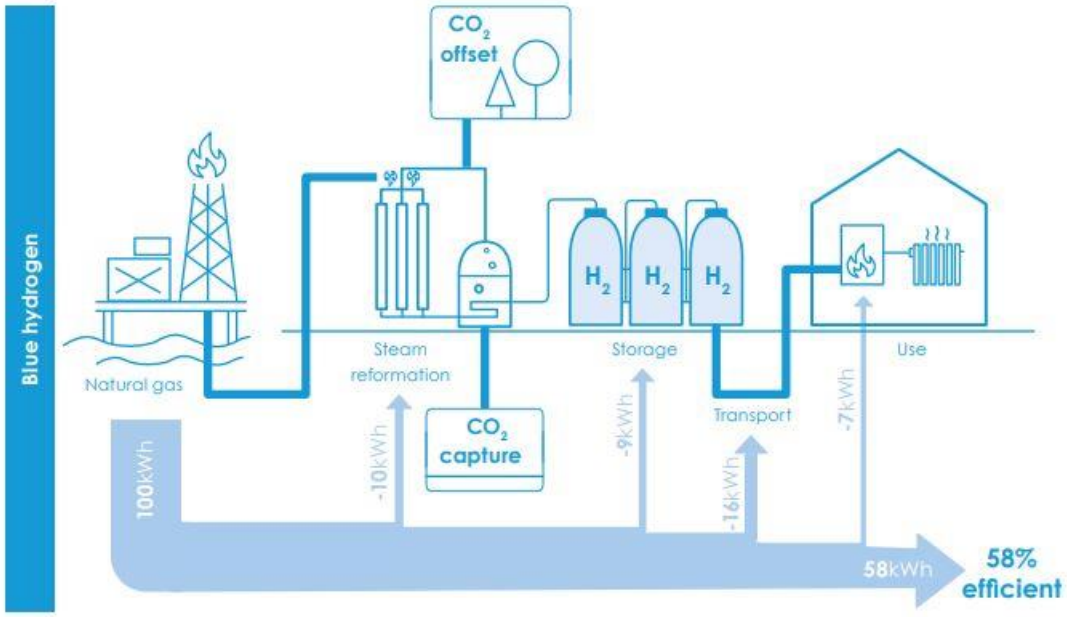
Consider the Fabric First

So before we decarbonize – consider the fabric

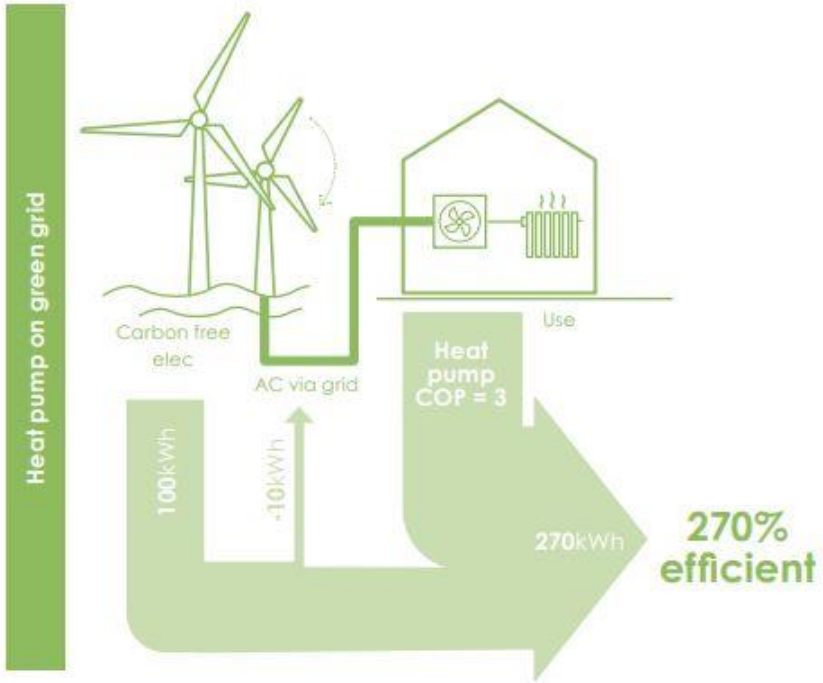
Is heat pumps the only solution?

Is hydrogen a decarbonisation route for heat in buildings?

Blue hydrogen vs. Green hydrogen



- Gas supply industry advocates blue hydrogen but this emits CO_2 and upstream GHG emissions
- Large scale carbon capture is proposed to deal with 90% of these emissions
- Significant uncertainties and large scale hydrogen storage required



Are heat pumps the solution for existing stock???
Hydrogen ready boilers

Department for Energy Security & Net Zero

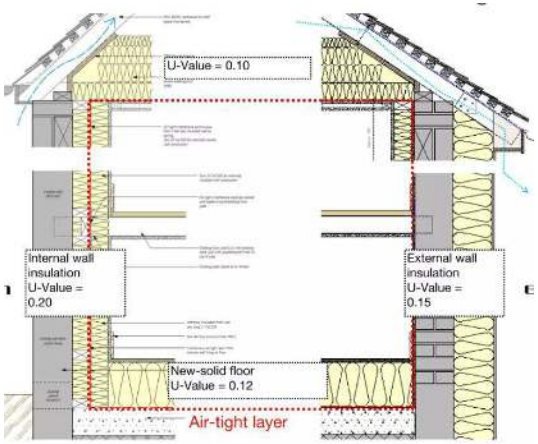
Hydrogen Strategy Update to the Market: December 2024

- Boilers which will be able to run on hydrogen blend up to 20% and amended to run on 100% hydrogen with a few part changes

- Uncertain future for roll out of hydrogen
- Kimberley Clarke have firmed up plans for 3 UK Hydrogen plants – one opposite our office in Northfleet

Why do you Need an MEP consultant?

So.. What is the future of energy in 2026 and beyond?



- New build Building Regulations, SAP, HEM and Future Homes Standard are pushing us down the heat pump route
- There are issues with cost, power demand acoustics with Heat pumps
- We must focus on fabric first approach to reduce the overall demand (kWh/year) for existing stock
- But energy targets need to be extended to the existing building stock
- Hydrogen roll out needs to accelerate (this is not included in the FHS calculation as an option), but could decarbonise existing buildings?
- Early MEP input will guide you through this minefield of delivery issues.

Thank you for listening

Q&A session